Summary

The present invention provides a process for the production of a semiconductor device comprising a semiconductor element provided on a printed circuit board with a plurality of connecting electrode portions provided interposed therebetween, the gap between said printed circuit board and said semiconductor element being sealed with an underfill resin layer. In accordance with the present invention, (1) the underfill resin layer is formed by melting a lamellar solid resin provided interposed between said printed circuit board and said semiconductor element, and (2) the lamellar solid resin provided interposed between said printed circuit board and said semiconductor element is heated for a predetermined period of time until the temperature of the solid resin layer reaches a predetermined range where the two components are connected to each other under pressure under the following conditions (X) and (Y):

(X) Supposing that the initial residual heat of reaction of the solid resin before heating is 100% as determined by a differential scanning calorimeter (DSC), the residual heat of reaction thereof is not more than 70% of the initial residual heat of reaction; and

(Y) The temperature of the semiconductor element is predetermined higher than that of the printed circuit board, and the difference in temperature between them is not less than 50°C.

In this manner, a production process which facilitates the resin sealing of the gap between the semiconductor element and the board and thus can inhibit warpage of the entire semiconductor device and a semiconductor device having an excellent reliability can be provided. In the present invention, the use of a sheet-like underfill material which gives an underfill resin layer having an elastic modulus in tension at 25°C of from 300 to 15,000 MPa when hardened can provide a semiconductor device which exerts an excellent effect of relaxing the stress on the semiconductor element, printed circuit board and connecting electrode portions and thus exhibits a high reliability.